AN ESTIMATE OF THE MIGRATORY TIMING AND ABUNDANCE OF SOCKEYE SALMON INTO UPPER COOK INLET, ALASKA, IN 2003

by

Pat Shields

and

Mark Willette

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Alaska Department of Fish and Game
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ABSTRACT

A test fishery was conducted during the 2003 Upper Cook Inlet (UCI) commercial salmon fishery, marking the 25th year this project has been operational. The primary objective of the test fishery is to estimate the abundance and run-timing of the sockeye salmon *Oncorhynchus nerka* return, measured along a transect at the southern boundary of the UCI management area. The test fishery was conducted from 1 July to 30 July and captured 2,613 sockeye salmon, representing 1,787 CPUE (catch per unit of effort) points. The mid-point of the 2003 return occurred on 14 July, which is 1 day early relative to the historical mean date of 15 July for the mid-point of the sockeye salmon return. The 2003 test fishery encompassed approximately 96.7% of the total run. During the month of July, two formal estimates of the size and timing of the 2003 sockeye salmon run were made, both having significant implications to sport and commercial fisheries management decisions.

KEY WORDS: Salmon, *Oncorhynchus*, Upper Cook Inlet, Alaska, test fishery, migratory behavior

INTRODUCTION

In 1979 the Alaska Department of Fish and Game (ADF&G) began an Offshore Test Fish (OTF) project near the southern boundary of the Upper Cook Inlet (UCI) salmon management area (Figure1). The objective of this project was to estimate the total run and run-timing of sockeye salmon *Oncorhynchus nerka* returning to UCI during the commercial salmon fishing season. These data have become extremely important to ADF&G management biologists as they set and adjust commercial fishing times and areas to most efficiently harvest sockeye salmon that are surplus to spawning needs. Moreover, the Alaska Board of Fisheries has assembled management plans which require inseason estimates of the size of the sockeye salmon run in order to implement specific components of the various plans. The OTF project is increasingly becoming one of the most important tools fishery managers utilize to make important inseason decisions.

Test fishing results have been reported annually since 1979 (Waltemyer 1983a, 1983b, 1986a, 1986b, Hilsinger and Waltemyer 1987, Hilsinger 1988, Tarbox and Waltemyer 1989, Tarbox 1990, 1992, 1994, 1995, 1996, 1997, 1998a, 1998b, 1999, and Shields 2000, 2001, 2002). This report presents the results of the 2003 test-fishing project.

METHODS

Test Fishing

Sockeye salmon returning to UCI were sampled by fishing 6 geographically fixed stations between Anchor Point and the Red River Delta (Figure 1). Stations were numbered consecutively from east to west, with station locations (latitude-longitude) being determined with global positioning system technology. A chartered test-fishing vessel sampled all six stations (numbered 4, 5, 6, 6.5, 7 and 8) daily, traveling east to west on odd-numbered days and west to east on even-numbered days.

Sampling started on 1 July and continued through 30 July. The chartered vessel, *F/V Corrina Kay*, fished 366 m (1,200 ft) of 13 cm (5 1/8 in) multi-filament drift gillnet. The net was 45 meshes deep and was constructed of double knot Super Crystal shade number 1 with a filament size of number 53/S6F.

All salmon captured in the drift gillnet were enumerated and identified to species and sex. Sockeye salmon only ($n \leq 30$ at each station) were measured for fork length (mid-eye to fork-of-tail) to the nearest mm and also had a scale removed (for age determination) from the left side of the fish approximately two scale rows above the lateral line on a diagonal that extended from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (Koo 1955). Scales were mounted on gum cards and impressions made in cellulose acetate, as described by Clutter and Whitesel (1956). The age of each fish was determined after examining scales with a microfiche viewer under 40x magnification. Ages were reported in European notation (Koo 1962) and followed criteria established by Mosher (1969) and Tobias et al. (1994).

The number of fish caught at each station was expressed as a catch per unit of effort (CPUE) statistic, which standardized catch reporting to the number of fish caught in 100 fathoms of gear in one hour of fishing time.

$$CPUE_S = \frac{100\,fm \;\; x \;\; 60\,\text{min} \;\; x \;\; number\ of\ fish}{fm\ of\ gear \;\; x \;\; MFT} \qquad (1)$$

where: $CPUE_s$ = CPUE for station s, and
MFT = mean fishing time.

Mean fishing time (MFT) was calculated as:

$$MFT = (C - B) + \frac{(\text{B} - \text{A}) + (\text{D} - \text{C})}{2} \qquad (2)$$

where: A = time net deployment started,
B = time net fully deployed,
C = time net retrieval started, and
D = time net fully retrieved.

Once deployed at a station, the drift gillnet was fished 30 minutes before retrieval started. However, prior to the net being fully deployed, it was capable of capturing fish, which is also true during the period of time the net was being retrieved. MFT was therefore adjusted by summing the total time it took to set and retrieve the net and then dividing this time in half and adding it to the time when the entire net was deployed and fished.

Daily CPUE data were summed for all six stations ($CPUE_d$) as follows:

$$CPUE_d = \sum_{s=1}^{n} CPUE_s \qquad (3)$$

The following physical and chemical measurements were taken at the start of each set: air temperature, water temperature (at 1 m below the surface), wind velocity and direction, tide stage, water depth, and water clarity. Air and water temperatures were measured using a YSI salinity/temperature meter. Wind speed was measured in knots and direction was recorded as 0 (no wind), 1 (north), 2 (northeast), 3 (east), 4 (southeast), 5 (south), 6 (southwest), 7 (west), or 8 (northwest). Tide stage was classified as 1 (high slack), 2 (low slack), 3 (flooding), or 4 (ebbing) by observing the movement of the vessel while drifting with the gill net. Water depth was measured in fathoms (fm) using a Simrad echo sounder, and water clarity was measured in meters (m) using a 17.5 cm secchi disk.

Describing the Salmon Migration

Beginning on about July 15, total CPUE on the final day of the test fishery ($CPUE_f$) was estimated each day by fitting a non-linear model (Mundy 1979) to the time series of cumulative daily $CPUE_d$, i.e.

$$y_d = 1/(1 + e^{-(a + bd)}) \quad (4)$$

where: y_d = cumulative daily $CPUE_d$ on day d,
a and b = coefficients of model,
d = day of observation.

Catchability, or the fraction of the available population taken by a defined unit of fishing effort, was estimated as:

$$q_d = c_d / r_d \quad (5)$$

where: q_d = estimated cumulative catchability on day d,
c_d = cumulative $CPUE_d$ on day d.
r_d = cumulative total return on day d, and

The cumulative total return on day d was estimated from the sum of all commercial, recreational, and personal use harvests to date, the estimated total escapement to date, and an estimate of the number of sockeye salmon residual in the district at that time. Total escapement to date included escapements into all monitored systems (Crescent, Susitna, Kenai and Kasilof Rivers, and Fish Creek,) and unmonitored systems, which are assumed to be 15% of the escapement into monitored systems (Tobias & Willette 2003). The number of fish residual in the district was estimated assuming exploitation rates of 70% in set net fisheries, 40% in district-wide drift net fisheries, and 25% in reduced district drift net fisheries (Mundy et al. 1993).

Passage rate, the expansion factor used to convert CPUE into estimated numbers of salmon passing the test fishing transect, was calculated as:

$$PR = 1/q_d \quad (6)$$

Total return at the end of the season (TR) was then estimated from

$$TR = PR \times CPUE_f \quad (7)$$

To calculate mean date of return, which is the day on which approximately 50% of the total run had passed the OTF transect, the following formula was used:

$$M = a/b \tag{8}$$

where: M = mean date of return,
a *and* b = coefficients of model

Since the test fishery did not encompass the entire sockeye salmon run, the total CPUE for the test fishery was estimated after the season using the following two methods:

$$CPUE_t^h = CPUE_f \; x \; \frac{H_t}{H_L} \tag{9}$$

where: $CPUE_t^h$ = total estimated CPUE for the season, based on harvest,
$CPUE_f$ = cumulative CPUE through final day, f, of test fishing,
H_t = total commercial harvest for the season
$H_{(L)}$ = total commercial harvest through final day of test fishery (f+2), and
L = number of days (lag time) it took salmon to travel from test fishery to commercial harvest areas (2 days).

$$CPUE_t^r = CPUE_f \; x \; \frac{E_t + H_t}{\sum_{S=1}^{6} E_L + H_{(L)}} \tag{10}$$

where: $CPUE_t^r$ = total estimated *CPUE* for the season, based upon total return,
$CPUE_f$ = cumulative *CPUE* through final day, f, of test fishing,
E_t = total escapement for the season
H_t = total commercial harvest for the season
$E_{(L)}$ = total Upper Cook Inlet escapement through final day of test fishery
$H_{(L)}$ = total Upper Cook Inlet commercial harvest through final day of test fishery
L = number of days (lag time) it took salmon to travel from test fishery to spawning streams or to be available for commercial harvest.

The total return adjustment to the total estimated CPUE (Eqn. 10) has replaced adjustments based on harvest alone (Eqn. 9) because of recent changes to the management plans governing the commercial fishery as well as the result of weak sockeye salmon returns to the Kenai River in 2000 and 2001. Current management plans allow for much less fishing in August than in past history and weak returns in 2000 and 2001 resulted in closures to the fishery in late July and August. Therefore, adjustments based on harvest alone would not have accurately reflected the additional fish that entered the district after the test fishery ceased.

The total return on the last day of the test fishery was computed by summing all commercial harvest data and estimates of escapement from the four sockeye salmon sonar enumeration sites, one weir site, and finally an estimate of escapement to all unmonitored systems through day d. As suggested by Mundy et al 1993, lag times (the time allowed for salmon to migrate from the test fish transect through the commercial fishery or to each of the escapement monitoring sites) are accounted for in determining the total commercial harvest and total escapement for day d. In the commercial fishery, all harvest that takes place up to two days after day d were included. In escapement, for the Crescent River, lag time is one day, for the Kasilof and Kenai Rivers, lag times are two days, and for Yentna River and Fish Creek, lag time is seven days. An estimate of sockeye salmon escapement to all non-monitored systems in UCI is considered to be 15% of the monitored escapement.

Two methods were used to estimate the adjusted final proportion of cumulative $CPUE_d$ on the last day of the test fishery. The harvest-based method used the ratio of $CPUE_f$ and $CPUE_t^h$ and the return-based method used the ratio of $CPUE_f$ and $CPUE_t^r$. Two sets of a and b coefficients were then calculated by substituting the two estimates of adjusted final proportion of cumulative $CPUE_d$ into eqn. 4. This was done for the current year and all historical years.

RESULTS AND DISCUSSION

A total of 2,613 sockeye salmon, 182 pink salmon *O. gorbuscha*, 1,000 chum salmon *O. keta*, 506 coho salmon *O. kisutch*, and 13 chinook salmon *O. tshawytscha*, were captured during the 2003 test fishery (Table 1, Appendices A-D). Sockeye salmon daily catches ranged from 4 to 549 fish (Table 1). The 16 July catch of 549 sockeye salmon was the largest single day catch since the test fish program began in 1979. The unadjusted cumulative total sockeye salmon CPUE for the duration of the 2003 project was 1,787 (Table 1), with CPUE values ranging from 5 to 280.

The test fish boat was unable to fish any of the six stations on 3 July as a result of a request by the Alaska State Troopers to transport a body back to the Homer harbor. While in route to their first fishing station, the test fish boat encountered a body floating in the water, which was later determined to be a passenger from a private wheeled plane that is believed to have crash landed in Cook Inlet. The test fish boat was also unable to fish on 27 July due to rough seas. Catch data from these two days was interpolated by averaging catches from the day before and day after the no-fishing days.

An analysis of post-season commercial harvest data indicated that the 2003 test-fishing project spanned approximately 98.0% of the total run. Therefore, the total CPUE for the test fishery would have been 1,824 if test fishing had continued throughout the duration of the run. Using the number of sockeye salmon that were commercially harvested (accounting for the 2 d lag-time) plus the number that escaped the fishery after the test fishing project ended (various lag times to different systems), shows the test

fishery encompassed 96.7% of the run. Based upon this method, the total CPUE estimate for the test fishery was 1,848.

A non-linear mathematical model (Mundy 1979) was used to examine the daily and cumulative test fish CPUE proportions of the sockeye salmon run to UCI. Using the total return-adjusted final test fish CPUE, this analysis suggested that 5.8% of the run had passed the transect prior to the start of test fishing on 1 July and that the run was 96.1% complete at project termination (Appendix E; Figure 2). Therefore, the mathematical model indicated that test fishing spanned 90.3% of the run.
The distribution of sockeye salmon catches along the test fish transect were similar to the distribution of CPUE values (Tables 2 and 3), which would be expected when fishing occurs at fixed intervals at each station. The mean date of the run was 14 July, or one day early relative to the historic average (Table 4).

Water temperatures measured along the test fish transect were 9-11° C early in July and then warmed to a high of 13.9° C at station 6 on 24 July; the average for all six stations was 13.1° C (Appendix F). The seasonal mean water temperature of 11.3° C was the third highest annual average since the project's beginning (Appendix G & H). Air temperatures fluctuated between 7.5° C and 19.0° C during the project, averaging 14.2° C for the year, which was the second highest annual average for the OTF project. Wind velocities averaged 12.9 knots for the month, a value exceeded only by the 2002 average of 13.0 knots. Wind direction was variable, but in general winds originated out of the south to southeast. On 27 July, strong winds and rough seas prevented the test fish boat from fishing all six regular stations. As reported earlier, the test fish boat was also unable to fish on 3 July as it was involved with transporting a body back to Homer. Catch statistics for these two days were interpolated by averaging test fish catch data from the day before and the day after the non-fishing days.

Appendix G provides a summary of the physical data that has been collected at each of the six test fish stations since 1992, the first year that station 6.5 was fished. Station 4, which is on the east side of Cook Inlet, was the shallowest station, averaging 24.4 fathoms (147 feet) in depth (changes in depth are a result of different stages of tide as well as minor differences in set location from day to day), and also had the clearest water, with a 1992-2003 secchi disk average depth of 8.2 m. In general, water clarity decreases as you travel from east to west (secchi disk average depth decreases from 8.2 m at station 4 to 2.9 m at station 8) as a result of numerous glacial watersheds draining into the west side of Cook Inlet. Winds have typically originated out of the southeast, and have averaged 8.8 to 10.5 knots.

During the 2003 commercial salmon fishing season, 2 formal estimates of the total run of sockeye salmon to UCI were completed (Appendix I). The first estimate was made on 22 July using the total run (catch and escapement) data through 21 July. Based upon the run to date of 4.775 million sockeye salmon, and the cumulative test fish CPUE of 1,445 points, a passage rate of 3,304 was determined. Again, the passage rate is an estimate of how many sockeye salmon had entered the district per test fish CPUE index point. An analysis of the fit of the current year's run curve to all previous year's curves revealed the top 5 best fits estimated a final cumulative 2003 test fish CPUE of 1,978 to 2,956 and thus, a total run of 6.5 to 9.8 million sockeye salmon. However, 3 of the top 5 best fits tracked late

returns while 2 of the best fits estimated that the run would be on time (on time refers to when 50% of the total run has entered the test fish transect on 15 July). There was more confidence at this time that the run was more likely on time than being late, so the total run estimates of 6.5 to 6.8 million sockeye salmon that tracked on time returns were emphasized. The second formal estimate of the 2003 total run was made following the commercial fishery on 24 July (Appendix I). By now, the total run had reached 5.4 million sockeye salmon with a test fish cumulative CPUE of 1,648 and a passage rate estimate of 3,268. The first best fit run-timing curve tracked the 1983 run, which was on time, and estimated a 2003 total run of 6.6 million fish. The fifth best fit also tracked an on time return (1995 run) and estimated a total run of 6.4 million fish.

Management plans passed by the BOF require ADF&G to make an estimate of the number of sockeye salmon in each year's run that are of Kenai River origin. Various management actions in both the sport and commercial fisheries are stipulated for total Kenai River sockeye salmon runs in 3 different ranges: (1) under 2 million fish, (2) between 2 and 4 million fish, and (3) greater than 4 million fish. The formal total run projection made on 22 July estimated the portion of the run through that date that was of Kenai River origin at 2.3 million fish (Table 5). The 2 on-time best fits estimated that the final Kenai River run would range from 3.4 to 3.6 million fish. Therefore, management plan actions for a Kenai River total run between 2 and 4 million sockeye salmon were implemented.

Table 6 shows the differences in the annual test fish cumulative CPUE statistic after post-season adjustments were made using either the harvest or total run method. These modifications were made for all years since the program was initiated. Although the changes are relatively minor, they do have an effect on the curve-fitting algorithms that are used to fit the current year's cumulative test fish CPUE to run-timing curves from previous years. The 2002 test fish season was the first year the total return method was officially used to make post-season adjustments to the CPUE statistic (Shields 2003).

The 2003 UCI sockeye salmon run marked the first time in the past 4 years where the mid-point of the run at the Anchor Point test fish transect line was not 2 days early (Figure 3). From 1988 through 1999, there had only been 2 years where the mid-point of the return occurred before 15-July. As can be seen in this figure, the only time the 20-July estimate error exceeds 15% is on returns that are 2 or more days early. In fact, for runs that are on 1-day early, on time, or late, the 20 July estimate error of the total return ranges from -6% to +15% of the actual return. However, for runs that enter the district two or more days earlier than average, the OTF curve-fitting estimator does not perform nearly as well, with an average error of +51.5%. It is quite likely that as additional data representing returns with more variable run timing are added to the database the OTF projections will become even more accurate. Tarbox and Waltemeyer (1989) provide further detail into to some of the assumptions the curve fitting procedures utilize to estimate the total CPUE during the season. One of the major assumptions of the curve-fitting procedures is that 24 June represents the first day of the sockeye salmon run to UCI. Variability in actual runs can therefore result in an average or early run being misclassified as late, especially during the first couple weeks of the test fish program. For this very reason, 20 July has been the approximate date that commercial fishery managers have used for their first official estimate of each year's total run.

During the 2002 and 2003 test fish project, scale samples were collected from all sockeye salmon used for length measurements (Table 7). These data were collected in an attempt to assess whether or not Kenai River sockeye salmon stocks, which are the dominant stock in Cook Inlet runs, could be identified using "size at age" criteria as they entered the district at the test fish transect. Statistical analyses will be conducted comparing the average size of each age-class of sockeye salmon collected at escapement monitoring sites to the average size of the same age-classes collected at the six stations along the test fish transect. The results of these analyses will be summarized in future test fish annual reports.

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Table 1. Summary of sockeye salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2003.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE		Mean Length (mm)
			Daily	Cum	Daily	Cum	
1-Jul	6	234.4	96	96	74	74	532
2-Jul	6	231.0	67	163	52	126	537
3-Jul[a]	6	227.0	40	203	32	158	539
4-Jul	6	218.5	14	217	11	169	542
5-Jul	6	222.0	72	289	53	222	548
6-Jul	6	239.5	170	459	113	335	558
7-Jul	6	223.5	91	550	69	404	549
8-Jul	6	210.5	30	580	25	429	558
9-Jul	6	225.5	81	661	59	488	540
10-Jul	6	230.5	84	745	61	549	559
11-Jul	6	220.5	41	786	31	580	567
12-Jul	6	230.5	78	864	66	646	558
13-Jul	6	226.0	64	928	42	688	568
14-Jul	6	239.5	124	1,052	89	777	554
15-Jul	5	213.0	202	1,254	125	902	562
16-Jul	6	249.5	549	1,803	280	1,181	561
17-Jul	6	214.0	48	1,851	43	1,225	560
18-Jul	6	237.5	103	1,954	75	1,300	552
19-Jul	6	231.5	63	2,017	51	1,350	553
20-Jul	6	218.5	11	2,028	9	1,359	557
21-Jul	6	242.0	136	2,164	86	1,446	560
22-Jul	6	217.0	57	2,221	44	1,490	554
23-Jul	6	242.0	165	2,386	116	1,606	558
24-Jul	6	225.0	53	2,439	42	1,648	549
25-Jul	6	218.0	20	2,459	16	1,664	544
26-Jul	6	229.5	40	2,499	30	1,694	556
27-Jul[a]	6	228.2	35	2,534	28	1,722	561
28-Jul	6	227.0	29	2,563	22	1,744	566
29-Jul	6	213.5	46	2,609	38	1,782	557
30-Jul	6	190.0	4	2,613	5	1,787	573

[a] The test fish boat was unable to fish on these days; the data was interpolated from day before and day after catches.

Table 2 Estimated sockeye salmon catch by date and station, Upper Cook Inlet offshore test fish project 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
7/1	0	12	14	22	23	4	74
7/2	2	10	12	6	5	18	52
7/3	1	5	7	5	2	12	32
7/4	0	0	2	4	0	5	11
7/5	2	1	3	5	41	2	53
7/6	0	17	54	10	32	0	113
7/7	0	37	4	22	4	2	69
7/8	4	16	0	3	0	1	25
7/9	11	7	37	3	1	0	59
7/10	19	18	5	18	0	1	61
7/11	0	23	1	2	1	5	31
7/12	0	14	2	31	6	12	66
7/13	1	38	0	0	1	3	42
7/14	3	37	27	6	12	4	89
7/15		22	55	3	36	8	125
7/16	15	114	51	76	23	0	280
7/17	0	13	1	7	16	7	43
7/18	3	17	29	14	11	2	75
7/19	9	17	18	0	7	0	51
7/20	2	3	4	0	0	0	9
7/21	1	4	53	24	2	3	87
7/22	17	10	10	2	4	1	44
7/23	19	12	43	37	5	0	116
7/24	22	8	6	4	1	2	42
7/25	1	3	7	2	3	1	16
7/26	0	3	1	0	23	3	30
7/27	1	4	5	0	17	2	28
7/28	2	5	8	0	8	0	22
7/29	2	7	6	3	10	11	38
7/30	0	1	4		0	1	5
Total	133.8	476.2	466.8	311.4	293.3	105.7	1787.3
%	7.5	26.6	26.1	17.4	16.4	5.9	100

Table 3. Estimated sockeye salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	16.0	18.0	28.0	29.0	5.0	96.0
2-Jul	2.0	12.0	15.0	8.0	6.0	24.0	67.0
3-Jul	1.0	6.0	9.0	6.0	3.0	15.0	40.0
4-Jul	0.0	0.0	3.0	5.0	0.0	6.0	14.0
5-Jul	2.0	1.0	3.0	6.0	58.0	2.0	72.0
6-Jul	0.0	22.0	88.0	11.0	49.0	0.0	170.0
7-Jul	0.0	50.0	5.0	29.0	5.0	2.0	91.0
8-Jul	5.0	21.0	0.0	3.0	0.0	1.0	30.0
9-Jul	13.0	9.0	54.0	4.0	1.0	0.0	81.0
10-Jul	26.0	25.0	6.0	26.0	0.0	1.0	84.0
11-Jul	0.0	31.0	1.0	2.0	1.0	6.0	41.0
12-Jul	0.0	19.0	3.0	33.0	8.0	15.0	78.0
13-Jul	1.0	59.0	0.0	0.0	1.0	3.0	64.0
14-Jul	4.0	51.0	40.0	8.0	16.0	5.0	124.0
15-Jul	-	26.0	106.0	4.0	56.0	10.0	202.0
16-Jul	7.0	255.0	83.0	172.0	32.0	0.0	549.0
17-Jul	0.0	17.0	1.0	8.0	19.0	3.0	48.0
18-Jul	4.0	22.0	41.0	20.0	14.0	2.0	103.0
19-Jul	7.0	23.0	24.0	0.0	9.0	0.0	63.0
20-Jul	2.0	4.0	5.0	0.0	0.0	0.0	11.0
21-Jul	1.0	5.0	88.0	37.0	2.0	3.0	136.0
22-Jul	23.0	13.0	13.0	2.0	5.0	1.0	57.0
23-Jul	24.0	16.0	65.0	53.0	7.0	0.0	165.0
24-Jul	29.0	10.0	7.0	4.0	1.0	2.0	53.0
25-Jul	1.0	3.0	8.0	3.0	4.0	1.0	20.0
26-Jul	0.0	4.0	1.0	0.0	31.0	4.0	40.0
27-Jul	1.0	5.0	6.0	0.0	21.0	2.0	35.0
28-Jul	2.0	6.0	10.0	0.0	11.0	0.0	29.0
29-Jul	2.0	8.0	7.0	4.0	12.0	13.0	46.0
30-Jul	0.0	1.0	2.0		0.0	1.0	4.0
Total	157.0	740.0	712.0	476.0	401.0	127.0	2613.0
%	6.0	28.3	27.2	18.2	15.3	4.9	100

Table 4. Mean date of the sockeye salmon run across Anchor Point transect, Upper Cook Inlet offshore test fish project, 1979-2003.

Year	Mean Date[a]	
	Coded	Calendar
1979	16.7	10-Jul
1980	13.9	7-Jul
1981	13.9	7-Jul
1982	22.8	16-Jul
1983	22.7	16-Jul
1984	18.5	12-Jul
1985	21.9	15-Jul
1986	22.5	16-Jul
1987	26.0	19-Jul
1988	21.4	14-Jul
1989	21.8	15-Jul
1990	25.8	19-Jul
1991	24.1	17-Jul
1992	24.4	17-Jul
1993	21.7	15-Jul
1994	27.4	20-Jul
1995	22.2	15-Jul
1996	20.8	14-Jul
1997	24.7	18-Jul
1998	24.5	18-Jul
1999	24.7	18-Jul
2000	19.8	13-Jul
2001	19.5	13-Jul
2002	19.7	13-Jul
2003	21.5	14-Jul
1979-2002 Average	21.7	15-Jul

[a] Day (1) = June 24.

Table 5. Total Kenai River sockeye salmon run (millions) in 2003 estimated from total offshore test fish CPUE and age composition run allocation by stock, 22 July, 2003.

Year	MSS	Estimated Total OTF CPUE			Passage Rate	Est. UCI Total Run	Est UCI Run to Date	Est UCI Run Remaining	Est. Kenai Run to Date	Prop. Kenai	Est. Kenai Run Remaining	Est. Total Kenai Run	Est. Total Kenai Esc.
		Current	Prev. Day	Timing									
1994	0.00053	2,956	2,992	Late 4 days	3,303	9.763	4.7750	4.9880	2.300	63%	3.143	5.443	1.756
1983	0.00074	2,054	2,069	On Time	3,303	6.785	4.7750	2.0100	2.300	63%	1.267	3.567	1.099
1987	0.00087	2772	2836	Late 2 days	3,303	9.156	4.7750	4.3810	2.300	63%	2.760	5.060	1.622
1995	0.00093	1,978	1,995	On time	3,303	6.532	4.7750	1.7570	2.300	63%	1.107	3.407	1.043
1991	0.00094	2,343	2,383	Late 2 days	3,303	7.738	4.7750	2.9630	2.300	63%	1.867	4.167	1.309

Table 6. A comparison of methods used to make post-season adjustments to the OTF final CPUE.

Year	Final OTF CPUE	Post-Season OTF CPUE Adjustment		Harvest Adjusted		Total Run Adjusted	
		Harvest-adjusted	Total Run-adjusted	*a*	*b*	*a*	*b*
1979	602	651	664	-3.2451	0.1876	-3.3380	0.2004
1980	740	770	777	-2.2537	0.1640	-2.2403	0.1612
1981	364	383	387	-2.5459	0.1856	-2.5243	0.1819
1982	651	775	786	-3.6839	0.1522	-3.7156	0.1633
1983	2,464	2,472	2,474	-4.2719	0.1883	-4.2732	0.1884
1984	1,331	1,334	1,341	-3.4257	0.1855	-3.4018	0.1834
1985	1,422	1,575	1,563	-3.4581	0.1523	-3.5633	0.1626
1986	1,653	1,731	1,714	-3.7671	0.1633	-3.8642	0.1719
1987	1,404	1,422	1,428	-4.3442	0.1689	-4.6385	0.1785
1988	1,131	1,145	1,169	-3.3682	0.1639	-3.5655	0.1662
1989	619	682	692	-2.7114	0.1258	-2.7031	0.1238
1990	1,358	1,404	1,426	-5.7913	0.2259	-5.7085	0.2211
1991	1,574	1,759	1,740	-4.5806	0.1885	-4.6331	0.1919
1992	2,021	2,186	2,195	-5.4366	0.2235	-5.4043	0.2217
1993	1,815	1,882	1,913	-4.0776	0.1906	-3.9018	0.1797
1994	1,012	1,145	1,199	-4.0770	0.1553	-3.9757	0.1453
1995	1,712	1,828	1,850	-4.7036	0.2131	-4.6219	0.2078
1996	1,723	1,765	1,796	-4.6328	0.2266	-4.4605	0.2144
1997	1,656	1,705	1,826	-3.8265	0.1621	-3.7000	0.1496
1998	1,158	1,355	1,313	-3.6700	0.1473	-3.7142	0.1515
1999	2,226	2,475	2,419	-5.3100	0.2175	-5.1500	0.2081
2000	1,520	1,532	1,565	-5.1094	0.2614	-4.9141	0.2480
2001	1,586	1,594	1,630	-3.9323	0.2002	-3.9823	0.2041
2002	1,736	1,749	1,825	-4.3694	0.2292	-4.0642	0.2068
2003	1,787	1,824	1,848	-4.5091	0.2117	-4.4402	0.2068

Table 7. Age-composition and mean length of sockeye salmon, by station, UCI offshore test fish project, 2003.

Station No.	Sample Size	Age Compositiion (%) 0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2
4	148		0.6	7.8	61.7	8.9	0.6	20.6	
5	296		0.3	6.6	75.6	4.7	0.8	11.8	0.3
6	288			6.6	75.0	2.3	0.9	15.2	
6.5	266		2.8	5.5	71.2	5.2	0.9	14.4	
7	230	0.4	1.5	5.5	69.7	3.0	0.4	19.6	
8	68			4.9	59.3	13.6		22.2	
Station Average =		0.4	1.3	6.2	68.7	6.3	0.7	17.3	0.3

Station No.	Sample Size	Mean Length (mm) 0.2	0.3	1.2	1.3	2.2	1.4	2.3	3.2
4	148		520	486	562	495	570	570	
5	296		580	494	561	505	572	563	475
6	288			492	562	509	580	561	
6.5	266		551	490	560	507	572	554	
7	230	485	543	484	559	527	595	561	
8	68			496	559	515		564	
Station Average =		485	549	490	561	510	578	562	475

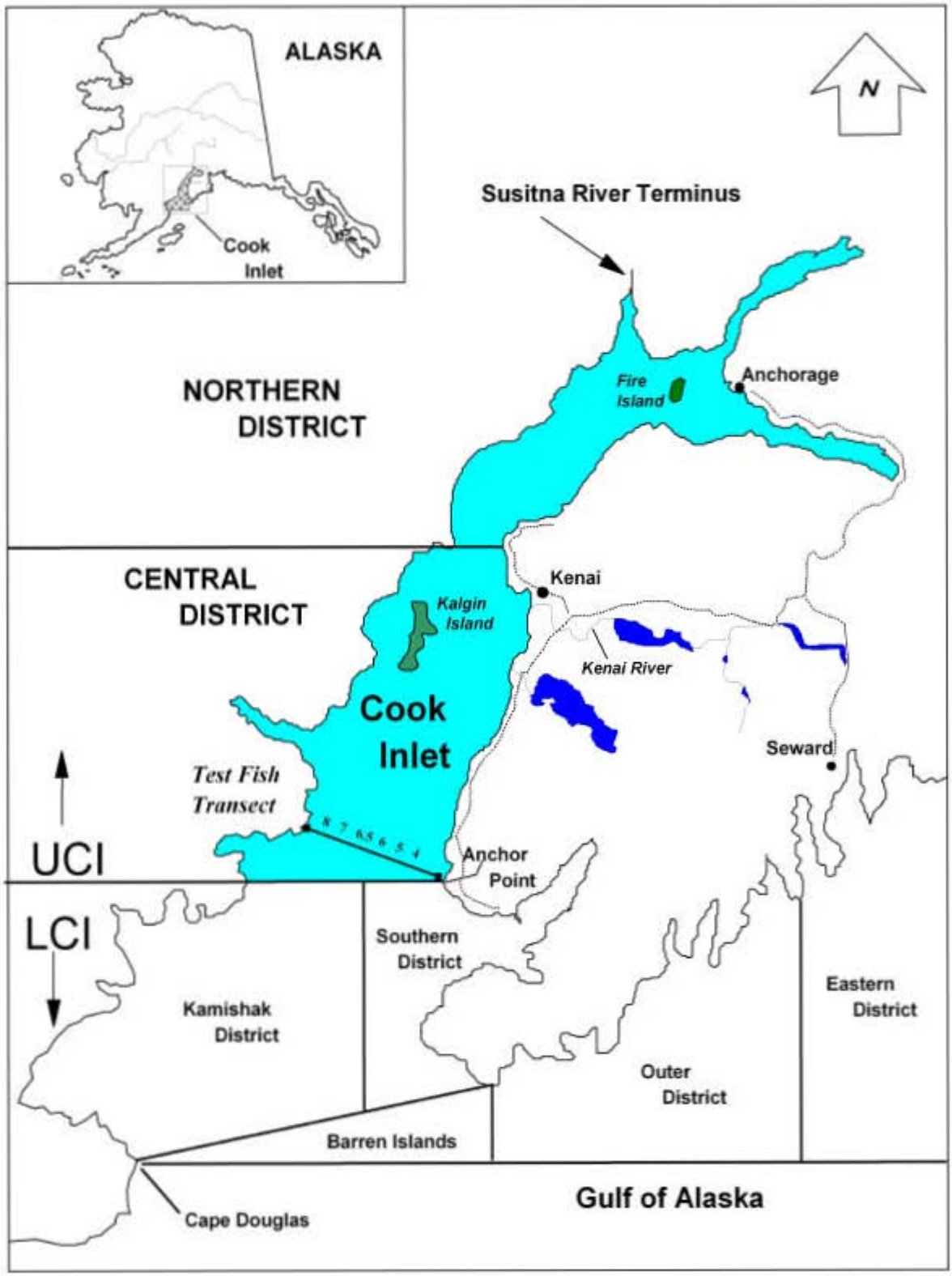

Figure 1. Location of fishing districts and offshore test fish transect in Cook Inlet, Alaska, 2003.

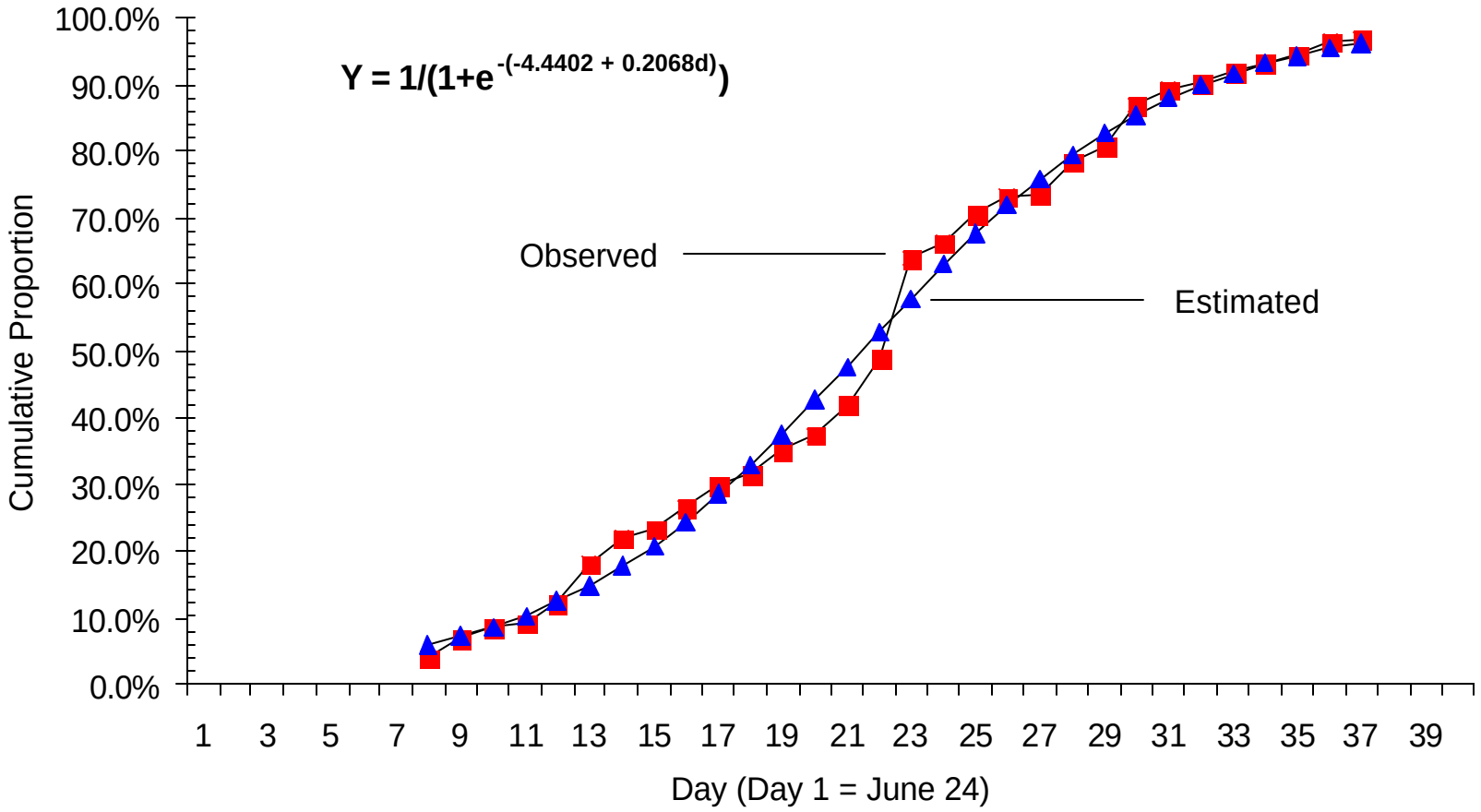

Figure 2. Cumulative proportions estimated for the sockeye salmon run to Upper Cook Inlet, Alaska 2003.

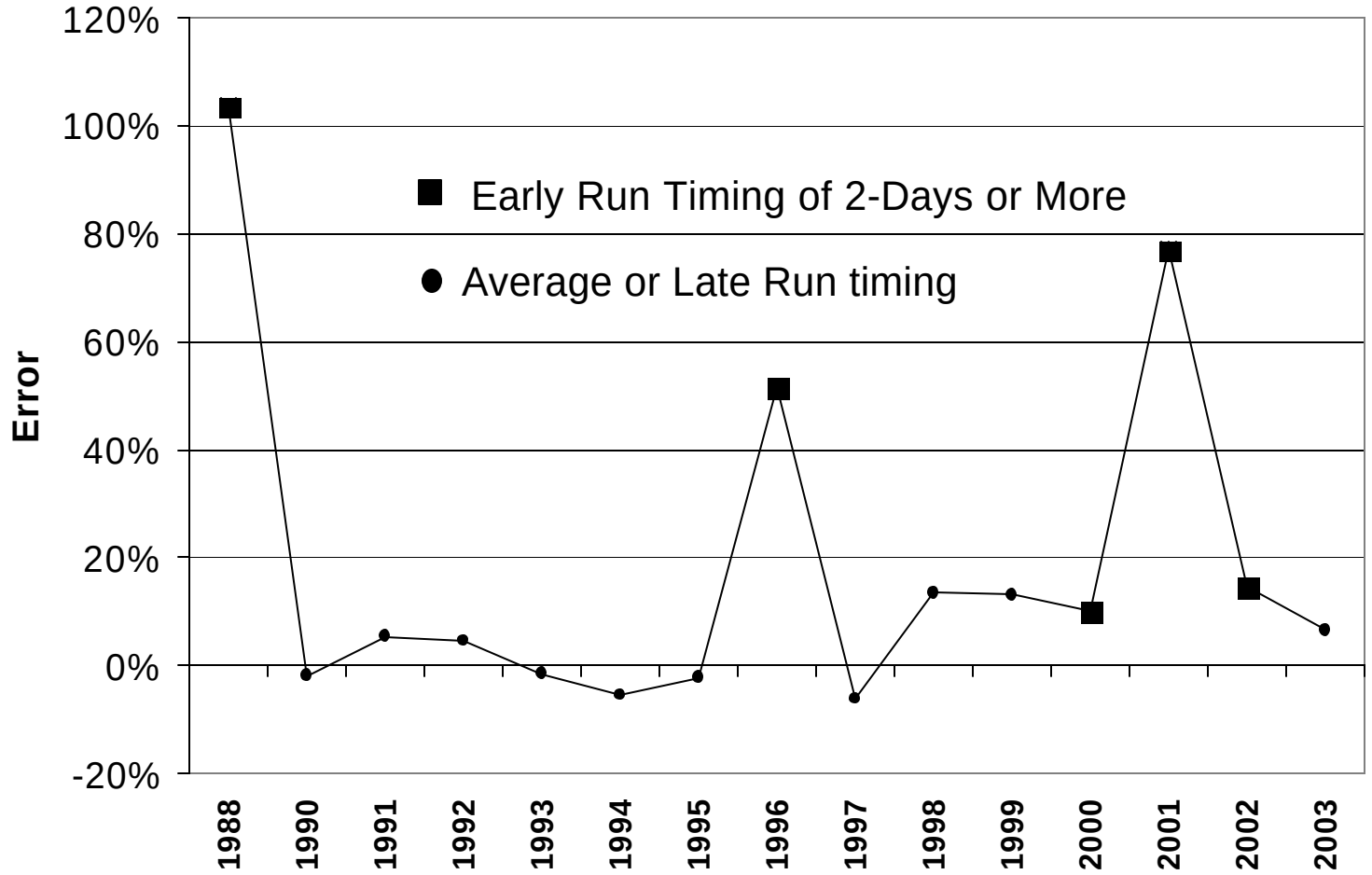

Figure 3. OTF error in forecasting the total run of sockeye salmon to Upper Cook Inlet using the July 20 best-fit estimate.

Appendix A.1. Summary of pink salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2003.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	234.4	7	7	5.3	5.3
2-Jul	6	231.0	0	7	0.0	5.3
3-Jul[a]	6	227.0	0	7	0.0	5.3
4-Jul	6	218.5	0	7	0.0	5.3
5-Jul	6	222.0	7	14	5.6	10.8
6-Jul	6	239.5	11	25	7.7	18.5
7-Jul	6	223.5	0	25	0.0	18.5
8-Jul	6	210.5	5	30	4.7	23.2
9-Jul	6	225.5	12	42	4.9	28.1
10-Jul	6	230.5	11	53	8.9	37.0
11-Jul	6	220.5	0	53	0.0	37.0
12-Jul	6	230.5	8	61	1.6	38.6
13-Jul	6	226.0	2	63	1.7	40.2
14-Jul	6	239.5	11	74	8.9	49.1
15-Jul	5	213.0	11	85	7.3	56.4
16-Jul	6	249.5	20	105	10.6	67.0
17-Jul	6	214.0	5	110	4.1	71.1
18-Jul	6	237.5	9	119	6.5	77.6
19-Jul	6	231.5	11	130	8.8	86.4
20-Jul	6	218.5	6	136	4.8	91.2
21-Jul	6	242.0	4	140	2.7	94.0
22-Jul	6	217.0	3	143	2.2	96.2
23-Jul	6	242.0	14	157	9.9	106.1
24-Jul	6	225.0	4	161	3.2	109.4
25-Jul	6	218.0	4	165	3.3	112.6
26-Jul	6	229.5	6	171	4.5	117.1
27-Jul[a]	6	228.2	5	176	3.9	121.0
28-Jul	6	227.0	4	180	3.1	124.1
29-Jul	6	213.5	1	181	0.8	125.0
30-Jul	6	190.0	1	182	0.8	125.8

[a] The test fish boat was unable to fish on these days; the data was interpolated from day before and day after catches.

Appendix A.2. Estimated pink salmon catch by date and station, Upper Cook Inlet offshore test fish project 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	2	3	0	0	2	0	7
2-Jul	0	0	0	0	0	0	0
3-Jul	0	0	0	0	0	0	0
4-Jul	0	0	0	0	0	0	0
5-Jul	0	0	2	3	1	1	7
6-Jul	1	2	4	1	3	0	11
7-Jul	0	0	0	0	0	0	0
8-Jul	0	1	0	2	2	0	5
9-Jul	1	2	0	0	2	7	12
10-Jul	1	5	2	3	0	0	11
11-Jul	0	0	0	0	0	0	0
12-Jul	0	1	0	0	0	7	8
13-Jul	0	0	0	2	0	0	2
14-Jul	0	2	5	2	2	0	11
15-Jul		0	4	4	3	0	11
16-Jul	0	3	7	8	2	0	20
17-Jul	0	2	1	1	1	0	5
18-Jul	0	2	2	4	1	0	9
19-Jul	1	2	1	1	6	0	11
20-Jul	0	0	3	2	1	0	6
21-Jul	0	1	1	2	0	0	4
22-Jul	1	0	2	0	0	0	3
23-Jul	0	1	5	5	2	1	14
24-Jul	0	1	2	1	0	0	4
25-Jul	0	1	1	1	1	0	4
26-Jul	0	2	2	0	2	0	6
27-Jul	0	1	1	1	2	0	5
28-Jul	0	1	0	1	2	0	4
29-Jul	0	0	1	0	0	0	1
30-Jul	0	0	0		1	0	1
Total	7	33	46	44	36	16	182
%	4%	18%	25%	24%	20%	9%	100%

Appendix A.3. Estimated pink salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	2.0	3.0	0.0	0.0	2.0	0.0	7.0
2-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jul	0.0	0.0	2.0	3.0	1.0	1.0	7.0
6-Jul	1.0	2.0	4.0	1.0	3.0	0.0	11.0
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jul	0.0	1.0	0.0	2.0	2.0	0.0	5.0
9-Jul	1.0	2.0	0.0	0.0	2.0	7.0	12.0
10-Jul	1.0	5.0	2.0	3.0	0.0	0.0	11.0
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jul	0.0	1.0	0.0	0.0	0.0	7.0	8.0
13-Jul	0.0	0.0	0.0	2.0	0.0	0.0	2.0
14-Jul	0.0	2.0	5.0	2.0	2.0	0.0	11.0
15-Jul		0.0	4.0	4.0	3.0	0.0	11.0
16-Jul	0.0	3.0	7.0	8.0	2.0	0.0	20.0
17-Jul	0.0	2.0	1.0	1.0	1.0	0.0	5.0
18-Jul	0.0	2.0	2.0	4.0	1.0	0.0	9.0
19-Jul	1.0	2.0	1.0	1.0	6.0	0.0	11.0
20-Jul	0.0	0.0	3.0	2.0	1.0	0.0	6.0
21-Jul	0.0	1.0	1.0	2.0	0.0	0.0	4.0
22-Jul	1.0	0.0	2.0	0.0	0.0	0.0	3.0
23-Jul	0.0	1.0	5.0	5.0	2.0	1.0	14.0
24-Jul	0.0	1.0	2.0	1.0	0.0	0.0	4.0
25-Jul	0.0	1.0	1.0	1.0	1.0	0.0	4.0
26-Jul	0.0	2.0	2.0	0.0	2.0	0.0	6.0
27-Jul	0.0	1.0	1.0	1.0	2.0	0.0	5.0
28-Jul	0.0	1.0	0.0	1.0	2.0	0.0	4.0
29-Jul	0.0	0.0	1.0	0.0	0.0	0.0	1.0
30-Jul	0.0	0.0	0.0		1.0	0.0	1.0
Total	7	33	46	44	36	16	182
%	3.8	18.1	25.3	24.2	19.8	8.8	100

Appendix B.1. Summary of chum salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2003.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	234.4	14	14	10.8	10.8
2-Jul	6	231.0	10	24	7.9	18.7
3-Jul[a]	6	227.0	5	29	4.0	22.8
4-Jul	6	218.5	1	30	0.8	23.6
5-Jul	6	222.0	16	46	12.1	35.6
6-Jul	6	239.5	58	104	38.5	74.1
7-Jul	6	223.5	5	109	5.2	79.3
8-Jul	6	210.5	9	118	9.5	88.8
9-Jul	6	225.5	14	132	10.8	99.6
10-Jul	6	230.5	17	149	12.1	111.8
11-Jul	6	220.5	2	151	1.6	113.4
12-Jul	6	230.5	28	179	22.4	135.8
13-Jul	6	226.0	9	188	5.7	141.5
14-Jul	6	239.5	33	221	23.9	165.5
15-Jul	5	213.0	66	287	39.1	204.6
16-Jul	6	249.5	123	410	70.5	275.1
17-Jul	6	214.0	8	418	6.5	281.6
18-Jul	6	237.5	76	494	55.6	337.1
19-Jul	6	231.5	39	533	30.9	368.0
20-Jul	6	218.5	18	551	13.9	382.0
21-Jul	6	242.0	108	659	69.8	451.8
22-Jul	6	217.0	34	693	26.8	478.7
23-Jul	6	242.0	89	782	63.3	542.0
24-Jul	6	225.0	24	806	19.3	561.3
25-Jul	6	218.0	19	825	15.6	576.9
26-Jul	6	229.5	52	877	39.0	615.9
27-Jul[a]	6	228.2	46	923	36.3	652.2
28-Jul	6	227.0	40	963	30.4	682.6
29-Jul	6	213.5	23	986	18.8	701.4
30-Jul	6	190.0	14	1000	11.8	713.2

[a] The test fish boat was unable to fish on these days; the data was interpolated from day before and day after catches.

Appendix B.2. Estimated chum salmon catch by date and station, Upper Cook Inlet offshore test fish project 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	5	0	5	2	2	14
2-Jul	0	2	4	0	3	1	10
3-Jul	0	0	2	1	1	1	5
4-Jul	0	0	0	1	0	0	1
5-Jul	0	0	4	2	10	0	16
6-Jul	0	1	19	6	32	0	58
7-Jul	0	0	3	2	0	0	5
8-Jul	0	1	0	7	1	0	9
9-Jul	1	3	4	3	2	1	14
10-Jul	1	4	1	11	0	0	17
11-Jul	0	1	0	1	0	0	2
12-Jul	0	7	3	6	12	0	28
13-Jul	0	9	0	0	0	0	9
14-Jul	0	0	11	6	15	1	33
15-Jul		0	29	2	35	0	66
16-Jul	0	23	29	30	41	0	123
17-Jul	0	5	1	0	2	0	8
18-Jul	1	3	18	23	29	2	76
19-Jul	4	20	7	0	8	0	39
20-Jul	0	1	13	2	2	0	18
21-Jul	0	1	33	69	4	1	108
22-Jul	1	3	23	3	2	2	34
23-Jul	3	7	25	37	12	5	89
24-Jul	2	7	7	7	0	1	24
25-Jul	4	2	1	9	2	1	19
26-Jul	0	16	1	0	26	9	52
27-Jul	1	10	11	2	18	4	46
28-Jul	1	5	21	3	10	0	40
29-Jul	0	0	3	1	14	5	23
30-Jul	1	11	0		0	0	14
Total	20	147	273	239	283	36	1,000
%	2%	15%	27%	24%	28%	4%	100%

Appendix B.3. Estimated chum salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	3.7	0.0	3.9	1.5	1.6	10.8
2-Jul	0.0	1.6	3.2	0.0	2.4	0.7	7.9
3-Jul	0.0	0.0	1.6	0.9	0.8	0.8	4.0
4-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
5-Jul	0.0	0.0	3.3	1.6	7.1	0.0	12.1
6-Jul	0.0	0.8	11.7	4.9	21.1	0.0	38.5
7-Jul	0.0	0.0	3.6	1.5	0.0	0.0	5.2
8-Jul	0.0	0.8	0.0	7.9	0.8	0.0	9.5
9-Jul	0.8	2.4	2.6	2.5	1.6	0.8	10.8
10-Jul	0.7	2.9	0.8	7.7	0.0	0.0	12.1
11-Jul	0.0	0.7	0.0	0.8	0.0	0.0	1.6
12-Jul	0.0	5.3	2.4	5.6	9.1	0.0	22.4
13-Jul	0.0	5.7	0.0	0.0	0.0	0.0	5.7
14-Jul	0.0	0.0	7.5	4.7	11.0	0.8	23.9
15-Jul		0.0	15.1	1.6	22.3	0.0	39.1
16-Jul	0.0	10.3	17.1	13.3	29.8	0.0	70.5
17-Jul	0.0	3.9	0.9	0.0	1.7	0.0	6.5
18-Jul	0.8	2.3	12.5	16.5	21.7	1.7	55.6
19-Jul	4.9	14.6	5.4	0.0	6.0	0.0	30.9
20-Jul	0.0	0.8	9.7	1.7	1.7	0.0	13.9
21-Jul	0.0	0.8	20.0	45.0	3.2	0.8	69.8
22-Jul	0.8	2.3	17.0	3.4	1.7	1.6	26.8
23-Jul	2.3	5.3	16.5	25.8	9.2	4.2	63.3
24-Jul	1.5	5.5	5.7	5.8	0.0	0.8	19.3
25-Jul	3.4	1.6	0.8	7.3	1.6	0.8	15.6
26-Jul	0.0	11.7	0.7	0.0	19.5	7.0	39.0
27-Jul	0.8	7.9	8.7	1.6	14.2	3.2	36.3
28-Jul	0.8	3.8	15.7	2.5	7.4	0.0	30.4
29-Jul	0.0	0.0	2.5	0.9	11.4	4.1	18.8
30-Jul	0.9	9.2	0.0		0.0	0.0	11.8
Total	17.7	103.9	185.0	168.2	206.8	28.9	712.9
%	2%	15%	26%	24%	29%	4%	100%

Appendix C.1. Summary of coho salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2003.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	234.4	7	7	5.3	5.3
2-Jul	6	231.0	1	8	0.8	6.1
3-Jul[a]	6	227.0	1	9	0.8	6.9
4-Jul	6	218.5	1	10	0.8	7.7
5-Jul	6	222.0	5	15	3.6	11.2
6-Jul	6	239.5	10	25	6.7	17.9
7-Jul	6	223.5	2	27	1.5	19.4
8-Jul	6	210.5	7	34	7.9	27.3
9-Jul	6	225.5	2	36	1.4	28.7
10-Jul	6	230.5	6	42	4.6	33.3
11-Jul	6	220.5	4	46	3.1	36.4
12-Jul	6	230.5	8	54	6.1	42.5
13-Jul	6	226.0	11	65	7.2	49.7
14-Jul	6	239.5	16	81	11.6	61.3
15-Jul	5	213.0	42	123	25.5	86.8
16-Jul	6	249.5	40	163	21.2	108.0
17-Jul	6	214.0	21	184	17.6	125.5
18-Jul	6	237.5	50	234	35.7	161.2
19-Jul	6	231.5	13	247	9.6	170.8
20-Jul	6	218.5	10	257	7.6	178.5
21-Jul	6	242.0	43	300	28.6	207.0
22-Jul	6	217.0	16	316	12.4	219.4
23-Jul	6	242.0	42	358	31.0	250.4
24-Jul	6	225.0	19	377	15.1	265.5
25-Jul	6	218.0	10	387	8.2	273.7
26-Jul	6	229.5	28	415	20.9	294.6
27-Jul[a]	6	228.2	28	443	22.1	316.7
28-Jul	6	227.0	28	471	21.6	338.3
29-Jul	6	213.5	17	488	14.2	352.5
30-Jul	6	190.0	18	506	15.2	367.7

[a] The test fish boat was unable to fish on these days; the data was interpolated from day before and day after catches.

Appendix C.2. Estimated coho salmon catch by date and station, Upper Cook Inlet offshore test fish project 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	0	5	2	0	0	7
2-Jul	0	0	0	1	0	0	1
3-Jul	0	0	0	0	0	1	1
4-Jul	0	0	0	0	0	1	1
5-Jul	0	0	0	0	5	0	5
6-Jul	0	0	5	2	3	0	10
7-Jul	0	2	0	0	0	0	2
8-Jul	0	0	0	7	0	0	7
9-Jul	0	0	2	0	0	0	2
10-Jul	0	3	3	0	0	0	6
11-Jul	0	3	0	0	1	0	4
12-Jul	0	1	0	0	7	0	8
13-Jul	0	10	0	0	1	0	11
14-Jul	0	2	7	5	2	0	16
15-Jul		0	22	7	13	0	42
16-Jul	1	8	0	25	6	0	40
17-Jul	0	7	5	7	2	0	21
18-Jul	0	0	24	18	7	1	50
19-Jul	0	9	2	0	2	0	13
20-Jul	0	0	9	1	0	0	10
21-Jul	0	3	16	20	2	2	43
22-Jul	5	2	8	1	0	0	16
23-Jul	11	7	8	5	11	0	42
24-Jul	2	9	2	2	2	2	19
25-Jul	0	3	2	1	3	1	10
26-Jul	0	9	0	0	17	2	28
27-Jul	0	6	4	3	14	1	28
28-Jul	0	4	8	6	10	0	28
29-Jul	0	4	6	1	5	1	17
30-Jul	1	4	0		13	0	18
Total	20	96	138	114	126	12	506
%	4%	19%	27%	23%	25%	2%	100%

Appendix C.3. Estimated coho salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	0.0	3.7	1.6	0.0	0.0	5.3
2-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
3-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
4-Jul	0.0	0.0	0.0	0.0	0.0	0.8	0.8
5-Jul	0.0	0.0	0.0	0.0	3.6	0.0	3.6
6-Jul	0.0	0.0	3.1	1.6	2.0	0.0	6.7
7-Jul	0.0	1.5	0.0	0.0	0.0	0.0	1.5
8-Jul	0.0	0.0	0.0	7.9	0.0	0.0	7.9
9-Jul	0.0	0.0	1.4	0.0	0.0	0.0	1.4
10-Jul	0.0	2.2	2.4	0.0	0.0	0.0	4.6
11-Jul	0.0	2.2	0.0	0.0	0.8	0.0	3.1
12-Jul	0.0	0.8	0.0	0.0	5.3	0.0	6.1
13-Jul	0.0	6.4	0.0	0.0	0.9	0.0	7.2
14-Jul	0.0	1.4	4.8	3.9	1.5	0.0	11.6
15-Jul		0.0	11.5	5.7	8.3	0.0	25.5
16-Jul	2.1	3.6	0.0	11.1	4.3	0.0	21.2
17-Jul	0.0	5.5	4.4	6.0	1.7	0.0	17.6
18-Jul	0.0	0.0	16.7	12.8	5.2	0.8	35.7
19-Jul	0.0	6.6	1.5	0.0	1.5	0.0	9.6
20-Jul	0.0	0.0	6.7	0.9	0.0	0.0	7.6
21-Jul	0.0	2.5	9.7	13.0	1.7	1.6	28.6
22-Jul	3.8	1.5	5.9	1.1	0.0	0.0	12.4
23-Jul	8.5	5.3	5.3	3.5	8.5	0.0	31.0
24-Jul	1.5	7.1	1.6	1.6	1.6	1.6	15.1
25-Jul	0.0	2.5	1.6	0.8	2.4	0.8	8.2
26-Jul	0.0	6.6	0.0	0.0	12.7	1.6	20.9
27-Jul	0.0	4.7	3.2	2.4	11.0	0.8	22.1
28-Jul	0.0	3.1	6.0	5.1	7.4	0.0	21.6
29-Jul	0.0	3.4	5.1	0.9	4.1	0.8	14.2
30-Jul	0.9	3.3	0.0		11.0	0.0	15.2
Total	16.8	70.2	94.6	80.7	95.5	9.6	367.9
%	5%	19%	26%	22%	26%	3%	100%

Appendix D.1. Summary of chinook salmon fishing effort, daily and cumulative catch, and daily and cumulative CPUE, Upper Cook Inlet offshore test fish project, 2003.

Date	Number of Stations	Mean Fishing Time (min)	CATCH		CPUE	
			Daily	Cum	Daily	Cum
1-Jul	6	234.4	1	1	0.8	0.8
2-Jul	6	231.0	2	3	1.6	2.3
3-Jul[a]	6	227.0	1	4	0.8	3.1
4-Jul	6	218.5	0	4	0.0	3.1
5-Jul	6	222.0	1	5	0.7	3.8
6-Jul	6	239.5	1	6	0.8	4.7
7-Jul	6	223.5	0	6	0.0	4.7
8-Jul	6	210.5	1	7	0.8	5.5
9-Jul	6	225.5	2	9	1.7	7.2
10-Jul	6	230.5	1	10	0.7	7.9
11-Jul	6	220.5	0	10	0.0	7.9
12-Jul	6	230.5	0	10	0.0	7.9
13-Jul	6	226.0	0	10	0.0	7.9
14-Jul	6	239.5	1	11	0.7	8.5
15-Jul	5	213.0	0	11	0.0	8.5
16-Jul	6	249.5	1	12	0.6	9.2
17-Jul	6	214.0	0	12	0.0	9.2
18-Jul	6	237.5	0	12	0.0	9.2
19-Jul	6	231.5	0	12	0.0	9.2
20-Jul	6	218.5	0	12	0.0	9.2
21-Jul	6	242.0	0	12	0.0	9.2
22-Jul	6	217.0	0	12	0.0	9.2
23-Jul	6	242.0	0	12	0.0	9.2
24-Jul	6	225.0	0	12	0.0	9.2
25-Jul	6	218.0	1	13	0.8	10.0
26-Jul	6	229.5	0	13	0.0	10.0
27-Jul[a]	6	228.2	0	13	0.0	10.0
28-Jul	6	227.0	0	13	0.0	10.0
29-Jul	6	213.5	0	13	0.0	10.0
30-Jul	6	190.0	0	13	0.0	10.0

[a] The test fish boat was unable to fish on these days; the data was interpolated from day before and day after catches.

Appendix D.2. Estimated chinook salmon catch by date and station, Upper Cook Inlet offshore test fish project 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0	0	0	1	0	0	1
2-Jul	0	1	1	0	0	0	2
3-Jul	0	1	0	0	0	0	1
4-Jul	0	0	0	0	0	0	0
5-Jul	0	0	0	0	1	0	1
6-Jul	0	0	0	1	0	0	1
7-Jul	0	0	0	0	0	0	0
8-Jul	0	0	0	0	1	0	1
9-Jul	0	0	0	2	0	0	2
10-Jul	0	0	0	1	0	0	1
11-Jul	0	0	0	0	0	0	0
12-Jul	0	0	0	0	0	0	0
13-Jul	0	0	0	0	0	0	0
14-Jul	0	0	1	0	0	0	1
15-Jul		0	0	0	0	0	0
16-Jul	0	0	1	0	0	0	1
17-Jul	0	0	0	0	0	0	0
18-Jul	0	0	0	0	0	0	0
19-Jul	0	0	0	0	0	0	0
20-Jul	0	0	0	0	0	0	0
21-Jul	0	0	0	0	0	0	0
22-Jul	0	0	0	0	0	0	0
23-Jul	0	0	0	0	0	0	0
24-Jul	0	0	0	0	0	0	0
25-Jul	0	0	0	1	0	0	1
26-Jul	0	0	0	0	0	0	0
27-Jul	0	0	0	0	0	0	0
28-Jul	0	0	0	0	0	0	0
29-Jul	0	0	0	0	0	0	0
30-Jul	0	0	0		0	0	0
Total	0	2	3	6	2	0	13
%	0%	15%	23%	46%	15%	0%	100%

Appendix D.3. Estimated chinook salmon CPUE by date and station, Upper Cook Inlet offshore test fish project, 2003.

	Station Number						
Date	4	5	6	6.5	7	8	Total
1-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
2-Jul	0.0	0.8	0.8	0.0	0.0	0.0	1.6
3-Jul	0.0	0.8	0.0	0.0	0.0	0.0	0.8
4-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5-Jul	0.0	0.0	0.0	0.0	0.7	0.0	0.7
6-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
7-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8-Jul	0.0	0.0	0.0	0.0	0.8	0.0	0.8
9-Jul	0.0	0.0	0.0	1.7	0.0	0.0	1.7
10-Jul	0.0	0.0	0.0	0.7	0.0	0.0	0.7
11-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14-Jul	0.0	0.0	0.7	0.0	0.0	0.0	0.7
15-Jul		0.0	0.0	0.0	0.0	0.0	0.0
16-Jul	0.0	0.0	0.6	0.0	0.0	0.0	0.6
17-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25-Jul	0.0	0.0	0.0	0.8	0.0	0.0	0.8
26-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-Jul	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30-Jul	0.0	0.0	0.0		0.0	0.0	0.0
Total	0.0	1.6	2.1	4.8	1.5	0.0	10.0
%	0%	16%	21%	48%	15%	0%	100%

Appendix E.1. Entry pattern of sockeye salmon into Upper Cook Inlet, Alaska, 2003 estimated from daily CPUE measured at the latitude of Anchor Point.

Day	Date	Input y	Estimated y	Residual	Change in Input Y	Change in estimated Y
8	1-Jul	0.0399	0.0584	-0.0185		
9	2-Jul	0.0682	0.0705	-0.0023	0.0281	0.0124
10	3-Jul	0.0853	0.0853	0.0000	0.0172	0.0148
11	4-Jul	0.0915	0.1029	-0.0114	0.0062	0.0176
12	5-Jul	0.1201	0.1236	-0.0035	0.0286	0.0207
13	6-Jul	0.1815	0.1479	0.0336	0.0614	0.0242
14	7-Jul	0.2187	0.1758	0.0428	0.0372	0.0280
15	8-Jul	0.2320	0.2079	0.0242	0.0133	0.0320
16	9-Jul	0.2640	0.2440	0.0201	0.0320	0.0361
17	10-Jul	0.2971	0.2841	0.0130	0.0331	0.0401
18	11-Jul	0.3141	0.3280	-0.0138	0.0170	0.0439
19	12-Jul	0.3497	0.3750	-0.0253	0.0356	0.0471
20	13-Jul	0.3723	0.4246	-0.0523	0.0226	0.0496
21	14-Jul	0.4205	0.4758	-0.0552	0.0482	0.0511
22	15-Jul	0.4880	0.5274	-0.0394	0.0674	0.0517
23	16-Jul	0.6393	0.5785	0.0607	0.1513	0.0511
24	17-Jul	0.6628	0.6280	0.0348	0.0235	0.0495
25	18-Jul	0.7033	0.6749	0.0284	0.0406	0.0469
26	19-Jul	0.7307	0.7185	0.0122	0.0274	0.0436
27	20-Jul	0.7354	0.7584	-0.0230	0.0047	0.0399
28	21-Jul	0.7822	0.7943	-0.0120	0.0468	0.0359
29	22-Jul	0.8063	0.8260	-0.0197	0.0240	0.0318
30	23-Jul	0.8689	0.8538	0.0152	0.0627	0.0278
31	24-Jul	0.8916	0.8777	0.0139	0.0227	0.0240
32	25-Jul	0.9004	0.8983	0.0022	0.0088	0.0205
33	26-Jul	0.9167	0.9157	0.0010	0.0163	0.0174
34	27-Jul	0.9317	0.9303	0.0013	0.0150	0.0147
35	28-Jul	0.9435	0.9426	0.0009	0.0119	0.0123
36	29-Jul	0.9642	0.9528	0.0114	0.0207	0.0102
37	30-Jul	0.9671	0.9613	0.0059	0.0029	0.0085

Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2003 offshore test fish project (page 1 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
1-Jul	4	12	9.8	20	south	ebb	31.6	23	7.0
	5	12	9.7	15	southwest	low	31.2	37	4.0
	6	13	9.6	12	south	flood	30.9	47	3.5
	6.5	14	10.0	18	southwest	flood	30.6	43	4.0
	7	11	10.0	15	southwest	flood	30.4	45	4.0
	8	11	9.8	10	southwest	flood	30.3	32	4.0
2-Jul	8	10	10.1	18	southwest	high	29.7	32	3.0
	7	10	10.0	25	southwest	flood	30.1	44	3.0
	6.5	11	9.9	39	southwest	flood	30.0	45	4.0
	6	13	9.9	35	south	ebb	30.4	46	4.0
	5	13	9.8	32	southeast	ebb	30.2	33	5.0
	4	14	9.5	28	southeast	low	31.7	21	6.0
3-Jul	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
4-Jul	4	14	9.7	0	none	ebb	31.5	24	10.0
	5	17	10.5	0	none	ebb	30.2	34	3.0
	6	18	11.4	0	none	ebb	29.6	45	2.5
	6.5	19	11.0	0	none	low	29.6	40	3.0
	7	18	11.6	0	none	flood	28.8	41	2.5
	8	17	11.3	0	none	flood	29.5	28	2.5
5-Jul	8	12	10.4	12	southwest	flood	29.7	31	3.0
	7	13	10.2	12	southwest	flood	30.6	44	4.0
	6.5	14	9.7	12	southwest	ebb	31.2	40	5.5
	6	13	9.6	8	southwest	ebb	31.4	47	8.5
	5	12	9.5	0	none	ebb	31.5	35	11.0
	4	16	9.8	8	southwest	ebb	31.8	22	11.0
6-Jul	4	16	9.9	8	southeast	high	31.7	23	11.0
	5	15	11.4	10	southeast	ebb	30.0	37	4.5
	6	14	11.3	10	southeast	flood	29.0	45	3.0
	6.5	15	11.3	12	southwest	flood	29.5	43	3.0
	7	16	11.6	10	south	flood	29.3	46	3.5
	8	15	11.4	0	none	flood	29.5	29	3.5

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2003 offshore test fish project (page 2 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
7-Jul	8	12	10.5	5	southeast	low	29.8	27	2.5
	7	15	10.9	0	none	flood	29.3	45	4.0
	6.5	14	11.3	8	south	flood	28.6	42	2.5
	6	18	11.0	8	south	flood	29.7	45	4.5
	5	13	9.8	0	none	flood	31.5	36	10.0
	4	15	9.7	0	none	high	31.7	24	11.0
8-Jul	4	15	9.8	10	northwest	flood	31.7	25	11.0
	5	17	9.8	5	northwest	flood	31.6	36	9.5
	6	15	11.8	8	northwest	flood	29.8	49	8.0
	6.5	14	12.0	10	southwest	ebb	29.5	43	4.0
	7	15	12.0	10	southwest	ebb	29.4	44	3.0
	8	17	12.0	10	southwest	ebb	29.2	27	2.5
9-Jul	8	14	11.2	20	southeast	ebb	29.0	29	2.5
	7	15	12.0	15	southwest	ebb	27.7	43	2.5
	6.5	16	12.0	18	southwest	low	27.8	41	4.0
	6	17	10.0	10	southwest	flood	31.0	48	6.0
	5	14	10.0	20	south	flood	31.5	36	7.0
	4	14	10.0	17	south	flood	32.0	25	12.0
10-Jul	4	12	10.0	18	south	flood	31.0	25	6.5
	5	12	11.0	20	south	flood	30.0	38	5.0
	6	12	11.0	17	southeast	flood	30.0	47	4.0
	6.5	14	11.0	22	southeast	flood	29.0	43	2.5
	7	15	11.0	24	southeast	high	30.0	44	2.5
	8	14	11.0	25	southeast	high	30.0	29	2.0
11-Jul	8	11	11.0	19	southwest	ebb	30.0	29	2.0
	7	12	11.0	15	southwest	ebb	30.0	42	3.5
	6.5	11	12.0	18	southwest	ebb	29.0	42	3.0
	6	12	11.3	10	southwest	low	29.0	46	5.0
	5	12	11.0	15	west	flood	31.0	37	5.5
	4	14	10.0	11	west	flood	32.0	25	9.0
12-Jul	4	17	10.5	5	southwest	low	31.6	22	7.0
	5	15	10.6	0	none	flood	31.2	35	9.0
	6	15	10.7	5	southwest	flood	30.8	47	7.0
	6.5	15	11.0	8	southwest	flood	31.0	40	6.0
	7	17	11.0	5	southwest	flood	31.0	44	4.0
	8	15	11.5	5	southwest	flood	30.0	29	3.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2003 offshore test fish project (page 3 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
13-Jul	8	12	11.0	5	southeast	ebb	30.0	27	3.0
	7	14	11.0	5	southeast	ebb	29.0	43	4.0
	6.5	14	11.0	0	none	ebb	30.0	40	4.0
	6	15	11.1	0	none	ebb	30.3	44	5.5
	5	15	10.5	0	none	ebb	31.3	34	5.5
	4	17	11.1	5	west	flood	31.4	23	6.5
14-Jul	4	18	11.0	15	southeast	flood	31.0	23	5.0
	5	14	11.0	18	southeast	flood	30.6	40	3.5
	6	14	11.0	10	south	flood	31.0	47	5.0
	6.5	14	10.4	20	south	flood	31.3	43	6.0
	7	15	7.2	18	southeast	flood	30.4	46	5.0
	8	14	11.0	12	southeast	high	30.5	28	3.0
15-Jul	8	15	11.0	18	southeast	ebb	30.0	27	3.5
	7	16	11.1	22	southeast	ebb	30.1	44	4.0
	6.5	17	11.4	25	southeast	ebb	29.9	40	5.0
	6	13	11.3	32	southeast	ebb	30.2	48	5.0
	5	14	10.8	42	southeast	flood	31.3	37	4.0
	4	-	-	-	-	-	-	-	-
16-Jul	4	7.5	10.9	25	southwest	ebb	31.2	22	6.0
	5	12	11.9	25	southwest	ebb	29.3	34	3.0
	6	13	11.7	30	southwest	low	29.8	46	3.0
	6.5	11	11.6	30	southwest	flood	30.0	41	2.5
	7	11	11.0	22	south	flood	31.0	46	2.0
	8	11	0.0	20	south	flood	0.0	-1	2.0
17-Jul	8	12	11.0	12	southwest	flood	30.0	31	4.0
	7	13	11.2	12	southwest	high	30.4	45	3.5
	6.5	12	11.2	15	southwest	ebb	30.3	41	4.0
	6	12	11.5	11	southwest	ebb	29.9	45	3.0
	5	12	11.7	4	southwest	ebb	29.8	34	4.0
	4	13	11.0	10	southwest	low	31.4	22	5.0
18-Jul	4	15	10.4	12	northwest	ebb	31.6	23	8.0
	5	16	10.9	0	none	flood	31.3	35	6.0
	6	16	11.6	5	southwest	flood	30.5	47	5.0
	6.5	14	11.8	10	southwest	flood	30.3	39	3.5
	7	13	12.1	15	southwest	flood	30.1	45	4.0
	8	14	11.7	15	southwest	flood	29.9	30	3.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2003 offshore test fish project (page 4 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
19-Jul	8	12	11.7	0	none	flood	29.4	31	3.0
	7	13	11.7	10	southeast	flood	29.6	45	3.5
	6.5	14	11.8	10	southeast	flood	29.7	43	4.0
	6	16	10.6	10	southeast	high	31.2	46	10.0
	5	15	10.5	14	southeast	high	31.4	36	10.0
	4	13	10.6	12	southeast	ebb	31.5	24	11.0
20-Jul	4	12	10.4	9	south	ebb	31.5	24	11.0
	5	13	10.5	5	south	ebb	31.0	35	9.0
	6	15	12.7	5	southwest	ebb	28.6	47	3.0
	6.5	15	12.4	10	southwest	ebb	29.2	41	3.0
	7	18	12.1	5	southwest	ebb	29.4	43	3.0
	8	19	12.2	5	southeast	low	29.4	28	3.0
21-Jul	8	13	12.3	15	south	flood	28.8	28	3.0
	7	13	12.4	15	southeast	flood	28.4	45	2.5
	6.5	14	12.7	15	southwest	flood	28.8	38	3.5
	6	14	12.6	15	southwest	flood	28.8	47	4.0
	5	13	10.6	24	southwest	flood	31.6	35	7.0
	4	12	10.6	25	southwest	flood	31.5	23	8.0
22-Jul	4	14	11.0	10	southwest	flood	31.0	25	6.5
	5	12	10.9	15	southwest	high	31.4	36	7.0
	6	16	13.0	12	southeast	high	27.6	47	3.5
	6.5	16	13.1	23	southeast	ebb	27.4	39	3.5
	7	15	13.4	20	south	ebb	27.4	44	3.5
	8	14	12.9	15	southeast	ebb	27.8	28	3.0
23-Jul	8	14	12.8	18	southeast	low	28.1	28	3.0
	7	15	13.3	15	southeast	flood	26.9	44	4.0
	6.5	17	13.4	10	southeast	flood	26.5	42	4.5
	6	15	13.5	22	southeast	flood	26.5	47	4.0
	5	18	11.7	18	southeast	flood	30.5	36	6.0
	4	14	11.8	18	southeast	flood	30.1	25	6.0
24-Jul	4	14	12.3	10	southeast	flood	29.8	24	6.0
	5	14	12.1	10	northeast	flood	30.0	37	6.0
	6	15	13.9	14	northeast	flood	25.7	46	4.0
	6.5	13	13.5	15	northeast	ebb	27.0	43	4.0
	7	15	13.8	10	northeast	ebb	26.3	44	3.5
	8	15	13.1	12	northeast	ebb	27.5	29	3.0

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Appendix F.1. Chemical and physical observations made in Upper Cook Inlet, Alaska during the conduct of the 2003 offshore test fish project (page 5 of 5).

Date	Station	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Tide Stage	Salinity (ppt)	Water Depth (f)	Secchi (m)
25-Jul	8	13	13.7	15	northwest	ebb	25.5	29	3.0
	7	12	13.6	15	northwest	ebb	25.8	44	3.5
	6.5	14	13.4	15	northwest	ebb	26.0	40	4.0
	6	15	13.2	18	north	ebb	26.4	46	4.5
	5	12	12.1	20	northwest	flood	29.9	36	6.0
	4	12	11.3	15	northwest	flood	31.1	24	7.0
26-Jul	4	14	11.2	5	southeast	low	31.1	22	14.0
	5	15	11.7	15	southwest	flood	30.8	36	10.0
	6	16	11.9	18	southwest	flood	31.1	45	8.0
	6.5	15	12.4	15	southwest	flood	28.7	43	6.0
	7	15	13.5	15	southwest	flood	26.4	45	4.0
	8	14	13.5	15	southwest	flood	26.4	29	4.0
27-Jul	4	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-
	6.5	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-
28-Jul	4	13	12.3	25	northwest	ebb	29.3	24	5.5
	5	14	11.8	22	northwest	low	29.3	35	5.0
	6	15	12.3	20	northwest	flood	28.5	47	5.0
	6.5	16	12.5	15	northwest	flood	27.5	39	4.5
	7	18	12.8	10	north	flood	27.0	45	5.0
	8	17	12.1	0	none	flood	28.8	29	5.0
29-Jul	8	12	12.2	5	southeast	flood	28.5	30	4.0
	7	13	12.3	5	southwest	ebb	28.0	45	6.0
	6.5	15	12.5	5	southwest	ebb	27.9	42	7.0
	6	14	12.3	5	southwest	ebb	28.2	46	6.0
	5	14	13.0	8	southeast	ebb	28.0	34	7.0
	4	15	11.3	0	none	ebb	30.2	22	8.5
30-Jul	4	13	10.9	3	south	ebb	30.8	22	8.0
	5	16	12.0	15	southwest	ebb	29.1	35	4.0
	6	16	11.3	12	south	ebb	30.2	46	3.5
	65	15	11.8	18	south	ebb	29.5	40	3.5
	7	14	12.2	18	south	low	29.0	44	3.0
	8	14	12.0	20	south	flood	28.9	28	3.0

Appendix G.1. Yearly mean values of physical observations made during the conduct of the 1992-2003 offshore test fish project.

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
4	1992	11.5	10.4	4.5	northeast	29.4	25.9	7.6
	1993	13.2	9.7	4.8	northeast	26.8	24.7	7.9
	1994	12.5	9.3	9.0	southeast	29.8	25.5	9.4
	1995	13.1	9.1	5.6	east	27.1	25.0	7.9
	1996	12.8	9.4	7.4	east	31.5	24.6	7.9
	1997	13.7	9.5	8.9	southeast	31.6	24.6	6.2
	1998	12.5	9.7	9.7	southeast	31.0	24.4	9.5
	1999	13.1	9.6	10.6	southeast	31.4	24.3	7.6
	2000	13.8	9.7	10.0	southeast	31.5	23.5	10.0
	2001	12.9	9.8	11.1	southeast	31.5	23.6	8.4
	2002	12.6	9.5	12.6	south	31.4	23.6	8.1
	2003	14.1	10.6	12.0	south	31.2	23.4	8.3
Station 4 Averages =		**13.0**	**9.7**	**8.8**	**southeast**	**30.4**	**24.4**	**8.2**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
6.5	1992	13.3	11.6	4.3	east	28.0	44.4	3.0
	1993	15.4	11.2	6.8	southeast	25.9	44.1	3.4
	1994	13.5	10.5	9.3	south	28.6	43.1	3.4
	1995	13.8	10.2	8.5	southeast	27.5	43.3	3.3
	1996	13.2	10.3	8.4	east	30.5	42.9	3.2
	1997	13.9	10.7	9.4	east	29.6	43.4	3.2
	1998	12.7	10.5	7.7	southeast	29.5	43.3	3.5
	1999	13.4	10.5	13.0	southeast	29.7	43.2	3.5
	2000	13.6	10.8	13.0	south	29.7	42.9	3.7
	2001	12.8	11.1	11.8	south	29.4	42.7	4.0
	2002	12.6	10.4	13.7	south	30.0	42.6	3.3
	2003	14.4	11.7	14.9	south	29.1	41.3	4.1
Station 6.5 Averages =		**13.5**	**10.8**	**10.1**	**southeast**	**29.0**	**43.1**	**3.5**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
5	1992	11.6	10.7	6.3	east	29.0	38.9	5.3
	1993	13.6	9.9	6.7	southeast	26.8	37.2	6.2
	1994	13.3	9.5	8.1	southeast	29.9	37.2	7.9
	1995	13.2	9.2	6.9	east	26.8	37.9	6.0
	1996	12.8	9.4	8.6	northeast	31.3	36.3	6.3
	1997	13.7	9.9	10.1	southeast	31.3	36.8	5.2
	1998	12.8	9.8	9.8	southeast	31.1	35.2	8.5
	1999	13.4	10.0	12.9	southeast	30.6	38.9	6.2
	2000	13.5	10.1	11.8	southeast	30.7	35.9	7.1
	2001	12.9	10.1	11.2	southeast	31.0	35.5	6.9
	2002	12.8	9.7	13.9	south	30.9	35.8	6.3
	2003	14.0	11.0	13.3	southeast	30.6	35.7	6.3
Station 5 Averages =		**13.1**	**9.9**	**10.0**	**southeast**	**30.0**	**36.8**	**6.5**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
7	1992	12.2	11.4	5.7	east	27.7	44.5	2.7
	1993	13.5	10.8	8.1	south	25.6	45.1	3.4
	1994	13.3	10.4	10.5	south	28.4	45.2	3.3
	1995	12.7	9.8	10.1	southeast	26.1	44.8	3.1
	1996	12.7	10.4	10.7	southeast	30.3	44.9	3.4
	1997	14.0	10.9	10.3	southeast	30.2	44.8	2.9
	1998	12.3	10.7	8.4	southeast	29.1	44.3	3.0
	1999	13.3	10.6	13.0	south	29.5	42.7	2.9
	2000	13.1	10.9	13.6	south	29.4	43.3	3.0
	2001	13.1	11.4	9.9	southeast	29.0	43.6	3.5
	2002	12.4	10.4	12.4	southeast	29.9	44.0	2.8
	2003	14.3	11.6	13.0	south	29.0	44.3	3.6
Station 7 Averages =		**13.1**	**10.8**	**10.5**	**southeast**	**28.7**	**44.3**	**3.1**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
6	1992	12.0	11.1	5.9	east	28.4	46.7	3.9
	1993	13.8	10.6	6.7	southeast	26.2	46.4	4.8
	1994	12.9	10.0	9.4	southeast	28.8	47.0	5.1
	1995	13.1	9.5	7.8	east	26.5	47.2	3.9
	1996	12.4	10.2	9.7	east	30.6	47.1	4.2
	1997	13.8	10.5	11.1	southeast	30.8	45.9	3.7
	1998	12.4	10.3	10.9	south	30.0	46.1	4.7
	1999	13.5	10.3	12.5	southeast	29.8	44.4	4.3
	2000	13.5	10.6	11.1	southeast	29.9	45.4	4.9
	2001	12.8	10.7	10.7	south	30.5	46.2	5.2
	2002	12.8	10.1	13.4	south	30.4	45.1	4.2
	2003	14.7	11.5	12.9	south	29.5	46.4	4.9
Station 6 Averages =		**13.1**	**10.5**	**10.2**	**southeast**	**29.3**	**46.2**	**4.5**

Station	Year	Air Temp (c)	Water Temp (c)	Wind Vel. (knots)	Wind Dir	Salinity (ppt)	Water Depth (f)	Secchi (m)
8	1992	12.2	11.4	5.1	east	27.8	29.7	2.5
	1993	12.7	11.1	8.2	southeast	25.4	27.7	3.4
	1994	12.7	10.6	9.2	southeast	28.1	28.9	4.2
	1995	12.9	9.9	9.2	east	25.9	28.4	2.7
	1996	12.2	10.4	9.3	southeast	30.3	29.9	2.7
	1997	13.7	11.1	9.6	southeast	30.1	30.1	2.6
	1998	12.5	10.7	9.1	south	29.1	29.3	2.8
	1999	13.6	10.5	11.8	southeast	30.0	25.9	2.6
	2000	13.2	11.0	14.0	south	29.5	29.1	2.6
	2001	12.8	11.3	9.5	southeast	29.0	28.9	3.1
	2002	12.1	10.3	11.8	southeast	30.0	29.4	2.4
	2003	13.7	11.2	11.6	southeast	28.1	28.9	3.1
Station 8 Averages =		**12.9**	**10.8**	**9.9**	**southeast**	**28.6**	**28.8**	**2.9**

Appendix H.1. Yearly mean values for selected chemical and physical variables collected during conduct of the 2003 offshore test fish project.

Year	Air Temp. (c)	Water Temp. (c)	Wind Vel. (knots)	Salinity (ppt)	Secchi (m)
1979	12.4	12.2	5.9	25.0	5.7
1980	12.4	10.0	8.2	24.8	4.2
1981	13.4	11.0	10.1	23.1	4.1
1982	12.0	8.5	9.0	20.3	5.0
1983	14.9	10.9	9.4	20.6	4.7
1984	13.5	10.8	9.1	14.3	5.3
1985	10.8	8.2	9.2	28.0	5.5
1986	10.6	9.1	8.2	-	5.4
1987	12.6	10.1	4.1	28.4	5.1
1988	14.2	9.1	8.9	30.2	4.7
1989	13.1	10.0	4.4	27.7	4.7
1990	12.3	11.4	8.5	21.3	4.6
1991	10.9	9.9	6.6	13.1	4.1
1992	12.0	11.1	5.4	28.4	4.3
1993	13.5	10.5	6.9	26.2	5.0
1994	13.0	10.0	9.3	29.0	6.0
1995	13.1	9.5	7.9	26.5	4.6
1996	12.6	10.0	9.1	30.8	4.7
1997	13.8	10.5	10.0	30.6	4.0
1998	12.5	10.3	8.3	30.0	5.4
1999	13.4	10.3	12.4	30.2	4.5
2000	13.5	10.5	12.2	30.1	5.2
2001	12.9	10.7	10.7	30.1	5.2
2002	12.5	10.1	13.0	30.4	4.5
1992-2002 Avg	13.0	10.3	9.6	29.3	4.8
2003	14.2	11.3	12.9	29.6	5.0

Appendix I.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2003 season (page 1 of 4).

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
Fit of 2003 data to 1979-2002 data

		Estimated Total CPUE			
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.01271	1,381	1,349	31	Early 5 days
1980	0.03699	1,291	1,250	41	Early 9 days
1981	0.03567	1,258	1,217	41	Early 9 days
1982	0.00125	2,062	2,062	0	Late 2 days
1983	0.00074	2,054	2,069	-14	On Time
1984	0.00630	1,547	1,523	24	Early 4 days
1985	0.00193	1,940	1,933	7	On Time
1986	0.00106	2,021	2,023	-3	Late 1 day
1987	0.00087	2,772	2,836	-64	Late 2 days
1988	0.00215	1,877	1,868	9	Early 2 days
1989	0.00689	1,942	1,914	28	On Time
1990	0.00277	2,884	3,006	-122	Late 3 days
1991	0.00094	2,343	2,383	-40	Late 2 days
1992	0.00234	2,440	2,512	-72	Late 2 days
1993	0.00122	1,905	1,904	1	Early 1 day
1994	0.00053	2,956	2,992	-36	Late 4 days
1995	0.00093	1,978	1,995	-18	On Time
1996	0.00110	1,757	1,758	0	Early 2 days
1997	0.00095	2,386	2,395	-10	Late 1 day
1998	0.00095	2,349	2,358	-9	Late 3 days
1999	0.00176	2,517	2,587	-70	Late 3 days
2000	0.00172	1,606	1,601	5	Early 2 days
2001	0.00259	1,614	1,600	14	Early 2 days
2002	0.00226	1,626	1,614	13	Early 2 days

TOTAL RUN THROUGH	**21-Jul**	**4,774,565**		
Cumulative Escapement			**1,763,850**	
Above Sonar				1,433,783
Below Sonar				100,000
Unassessed (15% of total assessed)				230,067
Cumulative Catch			**2,700,000**	
Daily Drift				150,000
Daily Set				200,000
Residual in District			**310,714**	
Drift (40% expploitation, if full district; 25%, if reduced district)				225,000
Set (70% exploitation)				85,714

2003 cumulative cpue	902	through	15-Jul	
2003 cumulative cpue	1,445	through	21-Jul	

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Appendix I.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2003 season (page 2 of 4).

Offshore Test Fishing Total Run Estimates for 2003

Passage Rate (Total Run/Cumulative CPUE) **3,304** Based on **21-Jul** harvest
Total cpue for season, if 15 July is 50% point: **1,804**

Run Estimate Based on Average Timing (15 July 50% Point) **5,960,771**
Run Remaining **1,186,207**

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

		Estimated Total CPUE			Estimated		Run	
Year	MSS	Current	Previous Day	Difference	Total Run	Timing	Remaining	Mean/Day
1994	0.00053	2,956	2,992	-36	9,767,008	Late 4 days	5,303,158	168
1983	0.00074	2,054	2,069	-14	6,787,878	On Time	2,324,028	68
1987	0.00087	2,772	2,836	-64	9,159,300	Late 2 days	4,695,450	147
1995	0.00093	1,978	1,995	-18	6,534,611	On Time	2,070,761	59
1991	0.00094	2,343	2,383	-40	7,741,040	Late 2 days	3,277,189	100
1997	0.00095	2,386	2,395	-10	7,882,492	Late 1 day	3,418,642	105
1998	0.00095	2,349	2,358	-9	7,762,616	Late 3 days	3,298,766	100
1986	0.00106	2,021	2,023	-3	6,676,262	Late 1 day	2,212,412	64
1996	0.00110	1,757	1,758	0	5,806,664	Early 2 days	1,342,813	35
1993	0.00122	1,905	1,904	1	6,295,189	Early 1 day	1,831,339	51
1982	0.00125	2,062	2,062	0	6,812,627	Late 2 days	2,348,776	69
2000	0.00172	1,606	1,601	5	5,306,243	Early 2 days	842,393	18
1999	0.00176	2,517	2,587	-70	8,317,887	Late 3 days	3,854,036	119
1985	0.00193	1,940	1,933	7	6,409,878	On Time	1,946,027	55
1988	0.00215	1,877	1,868	9	6,201,978	Early 2 days	1,738,127	48
2002	0.00226	1,626	1,614	13	5,373,517	Early 2 days	909,666	20
1992	0.00234	2,440	2,512	-72	8,061,844	Late 2 days	3,597,994	111
2001	0.00259	1,614	1,600	14	5,333,404	Early 2 days	869,553	19
1990	0.00277	2,884	3,006	-122	9,528,346	Late 3 days	5,064,496	160
1984	0.00630	1,547	1,523	24	5,111,791	Early 4 days	647,941	11
1989	0.00689	1,942	1,914	28	6,415,495	On Time	1,951,645	55
1979	0.01271	1,381	1,349	31	4,562,270	Early 5 days	98,420	-7
1981	0.03567	1,258	1,217	41	4,156,316	Early 9 days	-307,534	-21
1980	0.03699	1,291	1,250	41	4,267,337	Early 9 days	-196,513	-17

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Appendix I.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2003 season (page 3 of 4).

Total Run Estimate Based on Offshore Test Fishing Information

Assume 15 July is mean 50% point of run across transect (On Time)
Fit of 2003 data to 1979-2001 data

		Estimated Total CPUE			
Year	MSS	Current	Previous Day	Difference	Timing
1979	0.01489	1,475	1,444	33	Early 5 days
1980	0.03962	1,410	1,371	41	Early 9 days
1981	0.03918	1,376	1,337	41	Early 9 days
1982	0.00111	2,064	2,062	3	Late 2 days
1983	0.00073	2,029	2,035	-7	On Time
1984	0.00703	1,620	1,596	26	Early 4 days
1985	0.00177	1,963	1,955	10	On Time
1986	0.00094	2,020	2,019	2	Late 1 day
1987	0.00160	2,612	2,660	-51	Late 2 days
1988	0.00202	1,907	1,897	12	Early 2 days
1989	0.00660	2,012	1,990	25	On Time
1990	0.00470	2,609	2,686	-89	Late 3 days
1991	0.00133	2,252	2,277	-28	Late 2 days
1992	0.00337	2,284	2,327	-50	Late 2 days
1993	0.00111	1,918	1,912	6	Early 1 day
1994	0.00076	2,846	2,882	-34	Late 4 days
1995	0.00092	1,950	1,955	-7	On Time
1996	0.00105	1,774	1,766	7	Early 2 days
1997	0.00088	2,356	2,366	-8	Late 1 day
1998	0.00088	2,322	2,331	-7	Late 3 days
1999	0.00271	2,361	2,405	-50	Late 3 days
2000	0.00189	1,641	1,627	13	Early 2 days
2001	0.00295	1,665	1,647	19	Early 2 days
2002	0.00256	1,674	1,657	18	Early 2 days

TOTAL RUN THROUGH		**24-Jul**	**5,386,077**	5,216,883
Escapement			**2,095,577**	
	Above Sonar			1,722,241
	Below Sonar			100,000
	Unassessed (15% of total assessed)			273,336
Cumulative Catch			**3,121,306**	
	Daily Drift			56,398
	Daily Set			108,046
Residual in District			**169,194**	
	Drift (30% expploitation, if full district; 25%, if reduced district)			56,398
	Set (70% exploitation)			112,796

2003 cumulative cpue	902	through	15-Jul
2003 cumulative cpue	1,648	through	24-Jul

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Appendix I.1. Total return estimates for sockeye salmon to Upper Cook Inlet, Alaska, made during the 2003 season (page 4 of 4).

Offshore Test Fishing Total Run Estimates for 2003

Passage Rate (Total Run/Cumulative CPUE) **3,268** Based on **24-Jul** harvest
Total cpue for season, if 15 July is 50% point: **1,804**

Run Estimate Based on Average Timing (15 July 50% Point) **5,895,924**
Run Remaining **509,847**

Run Estimates Based on Model Results (Fit of Current Year to Past Years)

		Estimated Total CPUE			Estimated		Run	
Year	MSS	Current	Previous Day	Difference	Total Run	Timing	Remaining	Mean/Day
1983	0.00073	2,029	2,035	-7	6,631,477	On Time	1,414,594	27
1994	0.00076	2,846	2,882	-34	9,301,049	Late 4 days	4,084,166	86
1998	0.00088	2,322	2,331	-7	7,589,270	Late 3 days	2,372,387	48
1997	0.00088	2,356	2,366	-8	7,700,424	Late 1 day	2,483,540	51
1995	0.00092	1,950	1,955	-7	6,373,939	On Time	1,157,055	22
1986	0.00094	2,020	2,019	2	6,601,572	Late 1 day	1,384,689	27
1996	0.00105	1,774	1,766	7	5,797,190	Early 2 days	580,307	9
1982	0.00111	2,064	2,062	3	6,746,290	Late 2 days	1,529,407	30
1993	0.00111	1,918	1,912	6	6,267,426	Early 1 day	1,050,543	19
1991	0.00133	2,252	2,277	-28	7,359,447	Late 2 days	2,142,564	43
1987	0.00160	2,612	2,660	-51	8,535,854	Late 2 days	3,318,971	69
1985	0.00177	1,963	1,955	10	6,417,014	On Time	1,200,131	23
2000	0.00189	1,641	1,627	13	5,363,820	Early 2 days	146,937	0
1988	0.00202	1,907	1,897	12	6,233,273	Early 2 days	1,016,390	19
2002	0.00256	1,674	1,657	18	5,470,561	Early 2 days	253,678	2
1999	0.00271	2,361	2,405	-50	7,717,386	Late 3 days	2,500,503	51
2001	0.00295	1,665	1,647	19	5,442,847	Early 2 days	225,964	1
1992	0.00337	2,284	2,327	-50	7,465,763	Late 2 days	2,248,880	45
1990	0.00470	2,609	2,686	-89	8,525,526	Late 3 days	3,308,643	69
1989	0.00660	2,012	1,990	25	6,576,080	On Time	1,359,197	26
1984	0.00703	1,620	1,596	26	5,295,514	Early 4 days	78,631	-2
1979	0.01489	1,475	1,444	33	4,822,239	Early 5 days	-394,645	-12
1981	0.03918	1,376	1,337	41	4,495,544	Early 9 days	-721,339	-19
1980	0.03962	1,410	1,371	41	4,607,253	Early 9 days	-609,630	-17